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1. SCOPE

This document describes the important changes to the Trendsetter NEWS MCE firmware that comes with Controlled Release version 2.00. This firmware release consists of MCE Main Firmware Version 1.12 and MCE Slave Firmware Version 1.04.

Please refer to the TechPlanet firmware documentation pages or the Creo Service CD-ROM for information on commands, error messages, and NVS parameters for the Trendsetter NEWS.

Common acronyms used in this document are defined in Appendix A.

2. FORMATTING CONVENTIONS

The formatting conventions used in this document are as follows:

all NVS parameters are in italics and

commands to be typed into the diagnostic terminal are in bold as well as the diagnostic command responses.

3. PRELIMINARY CHECKLIST (READ BEFORE YOU BEGIN!)

Please ensure the following checklist is performed before the upgrade is started.

- ☐ Use the list version command to display the current MCE version.
- ☐ Ensure you have the entire controlled release package available.
- ☐ Read “readme” notes on the controlled release CD.
- ☐ Run the Version Checker applet[1] with the new controlled release version specified. Identify all components that need to be updated.
  - ☐ Head compatibility (Thermal 1.7x V1.83 or higher; Thermal 2 V1.02 or higher).
  - ☐ Print Console compatibility (Version 3.4 or higher).
  - ☐ Carriage compatibility (Version 1.42 or higher).
  - ☐ Xilinx compatibility (Version 1.65 or higher).

[1] Available from the Default Views of Service Shell 2.4; ensure the machine is on before running the applet.

☐ Check for any updates to the controlled release – for example, new scripts not included in the official Service Shell release. These updates would be stored in the Patches folder of the controlled release package.

☐ **GENINE board Part Number 10-4227D-A should be used with MCE main firmware 1.12.16 or greater. Previous versions of the GENINE board can go into thermal runaway.**

☐ Ensure that you allocate at least 4 hours for upgrading and testing the system. After the firmware upgrade, the entire system must be checked to make sure it is operating properly. This includes performing a visual check of plate handling, running a few plots to ensure proper image quality, and instructing the operators on any changes to the system operation. The customer should also be allowed to run a few plates to make sure the machine works to their satisfaction.

4. UPGRADE PROCEDURE

To upgrade the MCE firmware, please perform the following steps:

1. Install Service Shell 2.4 SP1.
2. Use the Version Checker applet to identify all firmware components that need to be upgraded. Note that both 1.7x head firmware and Thermal 2 firmware are included in the controlled release, but only one needs to be present. So ignore the warning for the head type not installed.
3. Run the FirmwareUpgrade.spt script from within Service Shell (see Appendix B for details) and select Upgrade Firmware. The script will automatically create backup files for all the NVS parameters on the device, then upgrade the firmware. The script allows several firmware components to be loaded in sequence – for example, MCE Main firmware and Xilinx. If RAM or Flash is found to be corrupted by the script refer to Appendix C.
4. After the upgrade is complete, run the Version Checker applet again to make sure all components are correct.
5. Note: Version Checker does not check Hydra Slave Head version but checks the Master Head version instead (known problem).

5. CHANGES SINCE V1.06

6. NVS CHANGES

The following table details new NVS parameters in this release.

NVS System	Param Name	Old Default	New Default	Description	Refer to Section
mh	TECAdjust	N/A	5.000 mm	Added as NVS parameter	
mh	TECMargin			Deleted as NVS parameter	
mh	LECMargin			Deleted as NVS parameter	
prd	TEMargin		7.000 mm	Added as NVS parameter	
prd	LEMargin		6.096 mm	Added as NVS parameter	

6.1 Diagnostic Command Changes

New commands:

Command	Description	Refer to Section
reset all (NEWS200 only)	Resets the master MCE board and all boards connected through CAN bus (diagnostic and RCON command)	

Modified commands:

Command	Description	Refer to Section
New parameter in RCON Image Start command RIF_MEDIA_UNLOAD_METHOD (All NEWS devices)	if the parameter is not specified in the Image Start command, then the firmware will assume a value of RIF_MEDIA_UNLOAD_METHOD_DEFAULT (which means the firmware gets to decide on how to unload the media - currently: manual load always manual unload).	Application Protoc. 4.1

Removed commands:

Command	Description	Refer to Section

6.2 Bug Fixes

6.2.1 Set status when plates physically put into the bay

Detects whether there are plates on the bay and clears "BayEmpty" flag .

6.2.2 Processor Interface bug fix

When Processor is busy the device does not suspend immediately but polls every 5 seconds for a total of 90 seconds after which it suspends.

6.2.3 Default number of focus learns set to 1 for all Newspaper models

The default for the number of focus learns is set to 1 for all Newspaper models. Before, it was 1 for any dual-plate or dual-head machine, but 2 otherwise, e.g. machines with rotators will do two focus learns.

6.2.4 Drum Subsystem

Fixed a bug where “drum stop at” was not stopping at the unload position for multiheaded plots.

6.2.5 Power supplies control

Added in a 5 second power-down delay after powering off drum supplies. This is so the drum amp can successfully power down before it tries to power up again. This will hopefully stop some of the drum amp failures due to the safety loop break.

6.2.6 Carriage Subsystem

- Fixed a problem where retraces didn’t work if carriage acceleration too low.
- Added timeout to "carriage init" command.

6.2.7 Value checking

Checks the startscan delay value before writing it to Xilinx.

6.2.8 Edge Detect

Carriage is re-initialized if edge detect fails, or if media is thought to be on the wrong pins.

6.2.9 Focus Learn

Only one focus learn is performed on all NEWS machines. Fixed the problem of skipping focus learns on a NEWS 200 machine.

6.2.10 Small Plates Unload

Fixed problem with unloading a small plate as part of a single job.

6.3 New Functionality for all NEWS Models

6.3.1 Media Handling

Device stops immediately if media is dropped into moving engine while plate cover is open . A new safety task is in place which monitors sensors on load ramp to detect if a new media is attempted to be dropped on a moving engine. A flyoff condition is triggered on detecting this.

Note: During Service Shell operations if the drum is spinning and ‘picker up’ command is issued the device stops because of safety task in place.

6.3.2 Automatic Load with Manual Unload

Ability to control whether a plate loaded through manual-bypass is unloaded back up the front or out the back .

Note: Device does not support media loaded automatically and unloaded manually.

6.3.3 Beam Balance

Setting "ehi tstk" to 0 means beam balance is never done.

6.3.4 Parameters Handling

Firmware saves all default values of all parameters at system initialization if they have not been saved. This is to guarantee that firmware upgrade does not change the default behavior of the device.

6.3.5 Debris Removal nozzle location change

UDRC location has changed to be on J43 instead of U67.

6.3.6 Statistics

Note: This logging is only available with Print Console V3.4 or higher.

Statistics tracking – full firmware implementation plus workstation analysis tool.

6.3.7 BBRAM Recovery from Corruption

BBRAM corruption has been seen so far on NEWS 200 (both MCE boards) and NEWS 70. Please see Appendix C for details of the problem.
There is a Service Shell script RecoverCorruptBBRAM.spt, that can be run on MCE devices which should be able to recover the BBRAM from the corruption that we have been seeing.

6.3.8 STG Fast Configuration

STG subsystem can be very slow once NVS starts growing. A RAM table to help with searching through the NVS has been added, i.e. STG subsystem has been configured for fast access.

6.4 New Functionality for NEWS 200

6.4.1 Error reporting of head/plotting errors on slave

Added detailed error reporting of head/plotting errors on slave (instead of reporting "an error has occurred on the slave").

6.4.2 Parameters match between Master and Slave

Passed the swath width (aka pixels per stroke) and resolution elements from Slave to Master. Master checks for consistency and raises an error if a mismatch is found.

6.4.3 Reset from Print Console to slave MCE board

Added 'reset all' diagnostic and RCON command that resets the master MCE board and all boards connected through CAN bus(those boards includes all Satellite boards and slave MCE board). The RCON 'reset all' command is sent to firmware through selection of the 'reset' menu option of the PrintConsole. Added 'reset all' diagnostic and RCON command that resets the master MCE board and all boards connected through CAN bus (those boards includes all Satellite boards and slave MCE board).

6.4.4 Dual-head support

Certain synchronization problems have been addressed.
Device is not ready to image until the slave reports its ready.
On power-up the slave (MCE2) board indicates in the Service Shell Device Monitor window that it is not ready. Currently, Print Console will not capture the actual cause but display a message "The SCSI data path was not established, check cable. Disable SCSI Scanning if the data path is from another workstation."

6.4.5 Slave drum parameters based on Master

Slave parameters margin, encoder resolution, drum diameter are now based on Master. Synchronizes the product specific drum parameters between master and slave.

6.4.6 Slave NVS parameters

Slave NVS parameters "carriage accel" and "focus basethickness" are retrieved from Master instead of NVS to ensure the value in both the master and slave are synchronized.

6.5 Known Problems

6.5.1 Image Artifact during Carriage Retrace

There is a known problem when carriage retraces are performed - image artifact. In such a case the image on the plate can contain residue from previous data already imaged. The problem pronounced itself with one or several incomplete vertical lines and other plate defects. Investigation is in progress for this problem. Please note that this problem is not expected to affect NEWS devices in normal operation because carriage retraces are not performed often (due to lower data rate).

The following is a brief summary of what is known about the problem:
Artifact has been discovered on News 150, with each machine running different firmware. Artifact happens with Thermal 1.7 head but not with Thermal 2.0 head. Artifact happens mainly at 1200 dpi. Artifact only happens when retraces are produced. Artifact can be reproduced. Artifact shows up on the TEC side of the plate, and shows up in the same part of the image. Artifact seems to be a result of data being duplicated a few inches from its correct location(in the subscan direction). Plates with dimensions 770x1029 have shown the problem. This problem does not show up on plates with a small mainscan size Atifact is generally about half a swath width wide and two to six inches long.

7. DEVICE CONFIGURATION PROCEDURES

7.1 Setting Up a Model

Ideally, all required NVS parameters would be configured automatically when the model is configured. This has not yet been done, in part because a single model can have different options that change its characteristics. The following list defines what settings must be verified when a model or feature is changed (do access dev first to gain access to commands):

- option autoloader enable — enabled for all models
- option dual-plate enable — if dual-plate functionality required
- option rotator enable — if rotator installed
- option dual-head enable — for NEWS 200
- mode n — ensure resolutions are set correctly

For Commercial options, set mode 1 as 2400dpi and mode 2 as 1200dpi; otherwise, set both mode 1 and mode 2 as 1200dpi.

Example: set mode 1 displays resolution parameters. Should be as follows:

News50 & 70:	1200
	1200
	2
	2
News50C & 70C	2400
	2400
	1
	1
News100 & 150	1200
	1200
	1
	1

set mode 2 displays parameters. For single resolution, repeat the mode 1 parameters. For dual resolution:

News50C & 70C	1200

1200

2

2

7.2 Thermal 2 Firmware Installation Notes

Please note that if a pre-release version of Thermal 2 firmware version 1.02 is running and a new head firmware version is installed, the following procedure is required before installing the new head firmware:
- th2 "eng"
- th2 "set sys firmwareversion 1.01"
- reset

If you have replaced the 1.7x head on the device and the head fails to initialize, run the service shell script "InitHDM9to16" in the "devices" script list. This script is included in Service Shell 2.4 SP1 (Service Pack 1).
Please read the " readme" notes on the controlled release CD for more information.

8. DEVICE CALIBRATION PROCEDURES

If the firmware is being loaded into a new machine or the NVS parameters have been erased without making a backup, then the following NVS parameters must be calibrated:

8.1 Setting the Plate Measuring Sensor Offset

The mh DistSensorToLEC parameter specifies the nominal distance between the Leading Edge Clamps (LEC) and the optical plate measuring sensor on the load ramp. This parameter is used by the firmware to measure the main-scan size of plates as they are being wound onto the drum. To calibrate this parameter, place a stack of plates of a known size into the bay, load the correct plate size information from the workstation, and verify that the media mainscan size is correct by entering the bay 1 command from the diagnostic terminal.

Type load bay 1 calibrate through diagnostics. This will cause a plate to be picked and loaded onto the drum. The plate size will be measured and the mh DistSensorToLEC parameter will be calibrated as the plate is wound onto the drum. The new value is automatically saved.

8.1.1 TEMargin Parameter

This NVS parameter affects the mainscan (around the drum) distance from trailing edge of the plate to the last imaged pixel.

8.1.2 LEMargin Parameter

This NVS parameter affects the mainscan distance from leading edge of the plate to the first imaged pixel.

8.1.3 TEAdjust Parameter

This NVS parameter adjusts the amount that the trailing edge magnetic clamp covers the plate. Any changes in the parameter will affect the length of plate being clamped by the TEC.
Before adjusting this parameter, make sure the LoadPos and TECParkPos parameters are properly calibrated.

To verify or adjust the TE clamp cover:
1. Load a plate and using the TEC as guide, draw a line on the plate.
2. After unloading the plate, measure the distance between the edge of the plate and the line.
3. Calculate "desired TE clamp cover distance minus value from step 2"
4. For positive values in step 3, add the amount to the current TECAdjust parameter to increase the cover.
For negative values in step 3, subtract the amount from the current TECAdjust parameter to decrease the cover. Please note that the value stored in mm in NVS does not directly correspond to what the device will actually clamp. For example, if the value stored in NVS is 7 mm the device could only be clamping 5 mm.

8.2 Calibrating the Unload Table Cup Rotate Position

The mhauto UtRotatorPos parameter specifies the nominal position for the unload table traveler to move to before rotating the unload vacuum cups. The firmware moves the traveler to this position and checks the rotate position sensor before attempting to rotate the cups. If the sensor is not tripped, then the traveler is moved slowly towards the away end of the table until the sensor is tripped or the firmware gives up and suspends.

Calibrate this parameter with the unload table in the down position (use the table down command). Move the traveler home by typing table home. Then type table move rotate. This command will move the traveler to the position specified by mhauto UtRotatorPos. The center of the optical interrupter tab on the traveler should be 1-2 millimeters towards the home side of the rotate position sensor, and the sensor should be tripped (check the sensor using the table command). Adjust the position by changing the mhauto UtRotatorPos parameter and re-typing table move rotate. The new value is automatically saved when it is changed.

On machines with short unload tables (most Trendsetter 400 and NEWS machines), the mhauto UtRotatorPos parameter should be set to 500 to make sure the traveler stops in the correct place when it is dragging a plate along the unload table.

8.3 Enabling Plate Rotation

The rotator is enabled in firmware by typing access expert then option rotator enable. Plate rotation is controlled from Print Console. If the rotator option is enabled, then a “Rotate Plate”

checkbox will show up in the Media Size settings in Print Console. If this box is checked, Print Console will tell the Trendsetter to rotate the plate during unload.

Without Print Console, rotation can be tested by typing:

- load bay 1 r 1 to load a plate from the bay and tell it to rotate on unload, or
- unload r 1 to unload the plate on the drum and tell it to rotate.

8.4 Adjusting Eject Speed and Distance

8.4.1 Eject distance

The plate will be pushed towards the processor at fast speed, then slowed down to match the processor intake speed.

The exit FastDistance parameter determines when the traveler slows down. This parameter should be set to the distance (in mm) from the traveler home position to the position of the far end of plate when the speed changes. To adjust this distance, enter set exit fastdistance <nn> where <nn> is the new value in millimeters.

To adjust the distance that the plate moves at slow speed, enter set exit slowpush <nn> where <nn> is the new distance value in millimeters.

The new values will be saved automatically when they are changed.

8.4.2 Eject speed

Enter set exit velocity to see the current slow speed setting.

Use the table move <position> <velocity> command to test different speeds and determine the best speed. Enter set exit velocity <nn> where <nn> is the new speed setting. The new value will automatically be saved.

8.5 Enabling Manual or Automatic Unloading

Plates loaded through manual-bypass will be unloaded through manual-bypass or automatically based on a configuration setup in Print Console. Automatic loading should be configured to automatic unloading only. Currently the device does not support automatic loading with manual unloading.

8.6 UDRC location changes

Modify the following parameters after typing "prm hazardous media enable" in Service Shell.
set debris NozzleFlowConst (from 2226.510 as default to 7280.0)
set debris NozzleFlowExp (from 2053.038 as default to 1822.0)

set debris PressMaxNozzle (from 4.977 as default to 6.0)

Check if modifications for UDRC are done properly by performing the following:
>>set debris nozzlesensortype 0

a) On the sensor change: make sure the 6 conductor cable has been used when connecting from GENINE J1 to the lower Pressure Sensor Daughter Card.

b) After downloading firmware, one can check the connections using these commands and expect these readings:

DVAC

NEWS>> dvac
Drum Vacuum Status
Drum Vacuum:
Drum Vaccum Reading: 0.00 kPa (-1 adjusted counts)
Drum Vacuum ADC Offset: 38
Drum Vaccum Drive: Off

Drum Vaccum Generator Drive: Off

*** Command Complete
NEWS>> dvac on
Turn on drum vacuum pump
*** Command Complete
C NET: PPP link is Down.
NEWS>> dvac
Drum Vacuum Status
Drum Vacuum:
Drum Vaccum Reading: 2.83 kPa (29 adjusted counts)
Drum Vacuum ADC Offset: 38
Drum Vaccum Drive: On

Drum Vaccum Generator Drive: Off

*** Command Complete

UDRC

NEWS>> scan ai_udrc
Group Name Status Value
AI_UDRC_POCNozzPress b 0000099Ah
AI_UDRC_POCNozzPressNF b 00000000h

```
AI_UDRC_PACCNozzPress     ** 00000000h
AI_UDRC_DiffPress         ** 00000000h
AI_UDRC_BellPress         ** 00000000h
*** Command Complete
debris blower on
NEWS>> debris blower on
*** Command Complete
scan ai_udrc
NEWS>> scan ai_udrc
Group Name          Status Value
AI_UDRC_POCNozzPress       b 00000E4Dh
AI_UDRC_POCNozzPressNF     b 00000000h
AI_UDRC_PACCNozzPress     ** 00000000h
AI_UDRC_DiffPress         ** 00000000h
AI_UDRC_BellPress         ** 00000000h
*** Command Complete
```

8.7 RAM vs. FLASH Parameters in MCE Machines

There are two separate types of NVS parameters that are accessed by the MCE firmware. Most parameters are stored in RAM. A few parameters that are not expected to be changed frequently are stored in Flash. Both sets of parameters must be backed up to fully capture the state of the machine; and both sets of parameters must be loaded onto a new board to restore the machine to its previous state. The FirmwareUpgrade.spt script automatically creates two separate files, one for each type of NVS, and expects both files when restoring parameters.

NVS parameters in general provide the following:

- Storage for machine-dependent parameters that must remain intact between power cycles.
- Storage for “state variables” that allow a machine to resume where it left off if power is cycled during loading or imaging.

All parameters are saved immediately as soon as they are changed.

When firmware is upgraded on a device, any new parameters will automatically be set to their default value. If a more complicated upgrade procedure is required, a script will be created to perform this upgrade, and this script will be released with the firmware.

APPENDIX A: COMMON ACHRONYMS

MCE	Master Control Electronics
CTP	Computer to Plate (this includes Trendsetters and Platesetters)
NVS	Non-Volatile-Storage
PDB	Power Distribution Board
GENINE	Generic I/O Node Electronics Board
LIONEL	Little I/O Node Electronics Board
POST	Power-On Self Test
BBR	Boot-block Recovery
PC	Print Console
TH2	Thermal 2 Head
TH1.7x	Thermal 1.7x Head
WS	Workstation
TSAL	Trendsetter Autoloader
TS	Trendsetter – base model
TSSP	Trendsetter Spectrum
NEWS	Trendsetter NEWS

APPENDIX B: NVS BACKUP/RESTORE AND LOADING FIRMWARE

Service Shell is required to load new firmware, and to backup or restore NVS parameters. A script has been written to simplify these tasks.

As part of the Service Shell install, a script named FirmwareUpgrade.spt is copied to the Device scripts folder. A document describing how to configure Service Shell and how to use the script is also included in the d:\ServiceShell\scripts\device folder. Service Shell is installed on every workstation before it leaves the factory, so this document will be present on every workstation. An updated copy with more MCE-specific information is available in the Trendsetter NEWS MCE Controlled Release V2.0.

Inside Service Shell, left-click on the Scripts icon, then left-click on the Device group. Double-click on FirmwareUpgrade.spt to start the script. It is very important to use this script for the upgrade to make sure a full NVS backup is performed.

IMPORTANT: BEFORE UPGRADING THE FIRMWARE OF ANY RECORDER MACHINE YOU MUST BACKUP THE CONTENTS OF THE CURRENT NVS MEMORY IN CASE IT BECOMES NECESSARY TO REVERT TO THE PREVIOUSLY INSTALLED VERSION OF FIRMWARE!

APPENDIX C: BBRAM CORRUPTION ON MCE DEVICES

BBRAM corruption has been seen so far on NEWS 200 (both MCE boards) and NEWS 70. There is a Service Shell script RecoverCorruptBBRAM.spt, to be run on a MCE device which should be able to recover the BBRAM from the corruption that we have been seeing. The problem is still under investigation. The corruption occurs in an unused portion of BBRAM, so the actual real data in BBRAM is not affected. If corruption occurs in a real portion of the BBRAM, the firmware will automatically recover. One can upload corrupted BBRAM from one MCE boards, and corrupt a new MCE by downloading the corrupted file. BBRAM corruption will normally be noticed when a service engineer attempts to change a NVS parameter which results in the firmware crashing.
The symptoms will be the following:

1) Using the "set" command to change specific NVS parameters will cause the firmware to crash. This will seem inconsistent to the user, some parameters will always work while others will always result in a crash. Also this will also not be consistent from device to device. Some parameters that may work on one device, will not work on another.

2) One would see the following errors on device startup:

```
MCE Power On Self-Test (POST) v1.05, Dec 10 2001 03:45:06
```

```
Copyright (C) 2000-2001 Creo Products Inc. All Rights Reserved.
MCE Board Revision:02 Configuration:00 Boot Cycles:3
9010: 1M SRAM Test ..............................PASSED
9011: 32K NonVolatile SRAM Test .................PASSED
9012: Quad Uart Test A+B+C+D+....................PASSED
9013: 68376 Uart Test A..........................PASSED
9014: NVS SRAM Verification FAILED
9015: NVS Flash Verification ....................PASSED
*** Initializing Firmware Subsystems ***
NUC 376 MCE ERR URT MON MOP PRD MSG UTL NVS STG PRM PST LCA
376s MCEs ERRs URTs NUCs PRDs PSTs CAN SIF SIO DF1 IOS NET SST STA HLT
DPC HIF CEH EHI DTL CRG RIF WMD GIM MIC MPC DRS SMC MDH MPI MDS OWB KEY IBM
DEB CTP VBS
*** Firmware Subsystems Init Complete ***
TSMCE Firmware Diagnostic Monitor
Version: 1.01.06 Build No: 00761 Date: Feb 13 2003 15:37:41
Built using Baseline #2650 - Feb 13 2003
Engineering Version - Not for Production Use
Machine Serial Number:  **Not Available**
BBRAM Nvs Found: Addr:00C90000h Size:16384 bytes IS CORRUPT!
Flash Nvs Found: P1:00020000h P2:00040000h Size:131072 bytes VERIFIED OK
CAN Bus Baud Rate is 500KHz.
C ---: Using PPP Client Protocol
C ---: Starting Telnet Server
Access level is: developer
```